Overview: The objective of this project is to assess annual surface ice velocities of glaciers in the Mount Everest region of Nepal in order to understand their dynamic responses to climate change. Imja, Lower Barun, and Hongu Glaciers have all responded to climate change by retreat, while their respective proglacial lakes have shown varying rates of dramatic growth. In addition to rapid lake growth, the moraines damming the lakes are composed of unconsolidated material and pose the risk of outburst flooding. Therefore, it is important to monitor the development of the three lakes, as well as surface ice velocity. Due to the extremely remote locations of the glaciers, Landsat satellite imagery is used to track surface ice velocity from 1992 to 2017.

Methodology

Contrasting Patterns in Surface Ice Velocity of Glaciers in the Nepal Himalayas

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Results

- Imja and Lower Barun Glaciers show similar patterns of rapid lake expansion, while Hongu Glacier’s lake growth is more stagnant
- Lower Barun Glacier shows long term accelerating trend of ice velocity near terminus, likely due to ice calving
- All three glaciers show variable short term trends, but show long term trends of deceleration of ice velocity

Future Work

- Expand study to include land-terminating glaciers with similar orientations and sizes to compare velocity patterns and rates of retreat
- Measure ice thickness to confirm glacial thinning
- Test methods on high-resolution satellite imagery such as Planet or RapidEye to gain a better understanding of the spatial patterns of change

Acknowledgements

Thanks to Dr. Robert Griffin (The University of Alabama in Huntsville) for being my faculty advisor. Special thanks to Dr. Umesh Haritashya (The University of Dayton) for his guidance and mentorship. This project was made possible through the NASA High Mountain Asia grant, Contract NNX16AQ62G